--A method for identifying resistance of a rice plant to rice blast is provided. More particularly, a method for identifying resistance of a rice plant to rice blast by testing a genotype of the rice genome using a DNA marker (G271), which is closely linked to a gene controlling the field resistance to rice blast, is disclosed. The disclosed invention allows for evaluation of the field resistance of a rice plant to rice blast using a DNA marker, thereby allowing for a resistant variety to be conveniently and accurately selected. The disclosed invention contributes to reducing the time and labor that have conventionally been required for cross breeding, and is useful in developing novel rice varieties having a high degree of field resistance to rice blast.--

A4

REMARKS

1. Status of the Claims

In this Amendment, claims 2, 3, 5, and 6 are canceled. Claims 1 and 4 are amended. Therefore claims 1 and 4 are pending and under consideration with entry of this Amendment.

A marked up copy of amended claims 1 and 4 is provided as Appendix A entitled "**MARKED UP COPY OF CLAIMS.**"

2. Support for the Amendments

Support for the amendments to the claims can be found throughout the specification, the drawings, and the claims as originally drafted. The amendments merely introduce limitations from dependent claims or clarify language. No new matter is introduced by this Amendment.

3. Objection to Claim 4

The Examiner objected to claim 4. Claim 4 is canceled in this Amendment, thereby rendering the objection moot.

4. Enablement Rejection

Claims 1-6 were rejected under 35 U.S.C. § 112, first paragraph as allegedly not enabled by the specification. Specifically, the Examiner argued that the specification fails to provide guidance for use of the RFLP marker G271 in RAPD, CAPS, SSR or AFLP analysis. The Examiner also argued that exact hybridization and amplification conditions and probes/primers to use in methods were not provided. Finally, the Examiner argued that deposit of the marker G271 was required for enablement. Applicants respectfully traverse the rejection.

As amended, the claims are directed to detecting the presence or absence of the marker G271 using RFLP or CAPS analysis to determine field resistance to rice blast disease. The invention is based in part on the discovery of a close genetic linkage between the G271 marker and the resistance gene *pi21(t)*.

As of the filing date, the marker G271 was known in the art. Specifically, the marker known as an RFLP markers in rice as early as the mid-1990s. As illustrated in Exhibit A, Genbank has contained the nucleotide sequence of the G271 marker since at least 1993. Since the nucleotide sequence of the marker was publicly available as of the filing date, there is no need for the marker to be deposited as the Examiner suggested. Those of skill in the art could have readily generated the marker using the sequence as a guide to either isolate or chemically generate the marker sequence.

Moreover, it was known which restriction enzymes could be used with marker G271 to detect polymorphisms between rice cultivars. As illustrated in Exhibit B, as early as 1996, 400 probes had been analyzed for polymorphisms based on a number of restriction enzyme digests. The Examiner is encouraged to visit ftp://ftp.dna.affrc.go.jp/pub/rice/japonicarice/tableall.txt on the internet to confirm that polymorphisms using various restriction enzymes were known for the marker G271. Unfortunately, that particular website is difficult to reproduce in paper form because of its width. The website demonstrates that various restriction enzymes were known and could be used with the marker G271.

In addition, specific hybridization conditions are not required for using the claimed invention. Because the marker is specific for the rice genome, from which the marker was isolated, hybridization stringency can be significantly varied within standard parameters well known in the art. Thus, those of skill in the art could have readily detected the presence or absence of marker G271 in a rice genome as of the filing date.

In addition, those of skill in the art could have also employed the marker as a CAPS (Cleaved Amplified Polymorphic Sequences) marker. CAPS analyses are substantially similar to RFLP analyses. CAPS markers involve amplifying a polynucleotide sequence from two genomes and then cleaving the amplification products to generate a polymorphism between the two products. At most, routine experimentation is necessary to generate CAPS markers from an RFLP marker. For example, primers are generated to amplify the RFLP marker (in this case the G271 marker) and then restriction enzymes that generate the RFLP are used to cleave the resulting amplification product. Accordingly, the specification provides sufficient information to enable those of skill in the art to make and use the full scope of the claimed invention. Withdrawal of the rejection is therefore requested.

5. ***Written Description Rejection***

Claims 1-6 were rejected as allegedly not meeting the written description requirement. Specifically, the Examiner argued that the claims encompass the use of a number of unspecified markers. Applicants respectfully traverse the rejection.

As amended, the claims are directed to the use of the marker G271 to detect disease resistance. Therefore, to the extent the rejection was directed to other markers, the rejection is moot.

As discussed above, the rice genetic marker G271 was known in the art as of the filing date of the present application. As recited in the Office Action, the written description requirement insures that the inventor's had possession of the claimed invention as of the filing date. *See*, Office Action, page 8. Since G271 was a known marker on the filing date, those of skill in the art would have understood that reference to

"marker G271" in the context of rice genetics, referred to the known marker. As discussed above, since the sequence of the marker was known, those of skill in the art would have recognized exactly what marker was described in the application. Accordingly, Applicants respectfully request withdrawal of the rejection.

6. Indefiniteness Rejections

Claims 1-6 were rejected for various indefiniteness issues.

Claim 1 was rejected for reference in line 3 to "the rice." As amended, the claim recites "the rice plant." Applicants thank the Examiner for noticing this typographical error.

Claims 1-4 were rejected for reciting "closely linked." As amended, the claims do not recite "closely linked." Therefore, withdrawal of the rejection is request.

Claims 1-4 were also rejected for reciting "using" allegedly without reciting an active positive step. As amended, the claims recite "detecting." Accordingly, Applicants request withdrawal of the rejection.

Claims 4 and 6 were rejected for allegedly lacking antecedent basis for "the polymorphism analysis." Claim 6 is canceled, thereby rendering the rejection moot. Withdrawal of the rejection is respectfully requested.

Claim 4 was rejected as indefinite for the recitation "the gene is shown to be present from the first generation rice varieties or progenies thereof." As amended, the claims clearly indicate that an individual having field resistance is selected. Accordingly, withdrawal of the rejection is requested.

The Examiner argued that claims 4-6 were indefinite because they allegedly omit the step of creating progeny plants from the first generation rice varieties. According to the Examiner, the claim involves extracting DNA from the progeny but does not provide for creating them. Applicants respectfully traverse the rejection.

The claims do not necessarily require creating progeny of the first generation. To the extent that DNA is extracted from progeny, it is inherent that the

progeny would be created. Thus, it is not necessary to include a step of creating the progeny in the claim. Accordingly, withdrawal of the rejection is requested.

7. Art Rejections

Claims 1 and 3 were rejected as allegedly anticipated under 35 U.S.C.§ 102 in view of Fukuoka *et al.* In addition, claims 1, 3-4 and 6 were rejected as allegedly obvious over Fukuoka *et al.* Specifically, the Examiner argued that the cited reference describes extracting DNA and using RFLP analysis to map resistance on chromosome 4. Applicants traverse both rejections.

As amended, the present claims recite methods of identifying field resistance using the marker G271. Indeed, the Office Action acknowledges that the prior art does not teach the use of the marker G271. *See*, page 9 of the Office Action. Accordingly, Applicants respectfully request withdrawal of the rejections.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

Please amend the title as follows:

DNA POLYMORPHISM-BASED METHODS [METHOD] FOR IDENTIFYING FIELD RESISTANCE OF RICE TO RICE BLAST

IN THE ABSTRACT:

Please amend the abstract as follows:

--A method for identifying resistance of a rice plant to rice blast is provided. More particularly, [there is provided] a method for identifying resistance of a rice plant to rice blast by testing a genotype of the rice genome using a DNA marker (G271), which is closely linked to a gene controlling the field resistance to rice blast, is disclosed. The disclosed invention [makes possible the advantage of allowing] allows for evaluation of the field resistance of a rice plant to rice blast using a DNA marker, thereby allowing for a resistant variety to be conveniently and accurately selected [indoor]. The disclosed invention contributes to reducing the time and labor [and the growth period which] that have conventionally been required for cross breeding, and is useful in developing [a] novel rice [variety] varieties having a high degree of field resistance to rice blast.--

IN THE CLAIMS:

1. (Once Amended) A method for identifying field resistance of a rice plant to rice blast, the method comprising the steps of:

extracting [a] genomic DNA from the rice plant; and

[using a] detecting the presence or absence of the DNA marker G271 in the DNA by RFLP or CAPS analysis [which is closely linked to a field resistance gene pi21(t) to analyze polymorphism at a site in the genomic DNA corresponding to the DNA marker], thereby determining the presence or absence of field resistance based on the presence or absence of the DNA marker G271 [the gene].

4. (Once Amended) A method for breeding a rice variety having field resistance to rice blast, the method comprising the steps of:

crossing a first rice variety having field resistance to rice blast with a second rice variety lacking the field resistance to rice blast so as to obtain first generation rice varieties;

extracting [a] genomic DNA from each of the first generation rice varieties or [progenies] progeny thereof;

[using a] detecting the presence of the DNA marker G271 in the DNA by RFLP or CAPS analysis [which is closely linked to a field resistance gene pi21(t) to analyze polymorphism at a site in the genomic DNA corresponding to the DNA marker], thereby determining the presence or absence of field resistance based on the presence or absence of the DNA marker G271 [the gene]; and

selecting an individual having field resistance [in which the gene is shown to be present from the first generation rice varieties or the progenies thereof].